

Interactive comment on “Heat, salt, and volume transports in the eastern Eurasian Basin of the Arctic Ocean, from two years of mooring observations” by Andrey Pnyushkov et al.

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The paper contains important and solid results based on the analysis of high resolution deep moorings in the Laptev Sea. Estimates of heat and salt transports in the Arctic Ocean are rare, as require expensive services and efforts. Results are new, contain new data of large team of scientists and represent a substantial contribution to understanding water mass transports, pathways and variability in the Arctic Ocean. The most of the paper text is well written and proved. However I recommend to make a major revision, as some editing/rewriting is very desirable and some questions are still open. Major comments: 1. Some sections (1 and 2), especially section 2.2 requires careful

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editing and rewriting. This section has a lot of typos (see minor comments below). Being familiar with system of currents in this region, I completely lost understanding after reading this paragraph. I advise to rewrite this paragraph clear, may be to present a table (locations, duration of observations, transports, references of previous studies) and show transects, cited in the text on the figure with all available previous estimates of transports. It will make clear the place of this study in the context of available data and publications.

2. Currents are found to be nearly barotropic and have very strong variability with the time periods from 10 to 100 days. Some profiles are depth intensifying (M15,M16). The authors refer variability to wind forcing and eddies, but don't consider another important player in the Arctic Ocean: topographically trapped barotropic Rossby waves, detected and examined in the Canada basin (Timmermans et al, 2010, J Mar Res). To my mind, It will be useful to check this hypothesis for this part of the Arctic ocean too. Or make a comment, why it is not the case.

Scientific significance:

1 Scientific quality : 2 Presentation quality: 2

Some minor comments are below.

Page 2: 15. "Observations will be used" or already used? 10. "Branches converges and propagate" . These flows are converges laterally? Which is closer to the shelf break? 14. "We do not have yet such estimates" – may be somebody already has? Better to use "to our knowledge, " Page 3. Paragraph 2.2 is written unclear with a lot of typos. Also you define AW as waters warmer 0C, then "Approximately 3.0 ± 0.2 Sv of this transport constitutes AW (water warmer than 2°C) transport into the Arctic" N 25 May be to start with the definitions of AW first and discuss contradictions in definitions? ". In this transport, about 1.3 ± 0.1 Sv is carried by the steady Svalbard branch of the WSC (annual mean transports vary in the range of 1.0-1.5 Sv only), whereas $\sim 1.7 \pm 0.1$ Sv is transported by the highly variable (annual mean transports vary in the range of 1-2 Sv) offshore WSC branch – the branch which feeds the flow toward the Yermak Plateau". Please, make this statement clear, may be include diagram. It will be confusing for the reader that "mean net northward transport by the West Spitsbergen Current (WSC) as high as 6.6 ± 0.4 Sv", then you talk about mostly eastward transports in the Laptev sea. May be change it by 'alongslope' cyclonic current? 5. "Below the CHL,

both temperature and salinity increase with depth, forming the permanent pycnocline". It is not quite correct statement, as contradicts statements starting 10. 19-20 a lot of typos. Page 4: N19: "single moorings, these are" Page 6. "This dataset was used successfully, for example, in previous studies of long-term changes of the thermohaline state of the EB" – to my mind, "successful" is not scientific terminology. Page 7. The following looks confusing: to use word 'transport' both for depth integrated and along slope (which is also depth integrated). Is it accepted general terminology? May be better to use 'depth integrated flux' for the first and 'transport' for along slope value which is also depth integrated. Use of 'T' for transports and temperature a little bit confusing. May be to change notation? Page 19 N 28. "we consulted simulations". Please, check this statement. My impression that you could consult somebody, not something. 5.2 page 15. N 4. "We estimated net volume transports for AW using temperature and salinity measurements from the mooring array" – velocity is missed N8: "This difference is due to the decrease in mean eastward velocities with depth, so that in the AW layer velocities become smaller than those observed in the cold halocline and surface mixed layers." I see strong increase in stations M15 and M16 towards depth. And negative currents (anti-cyclonic) in the surface layer. How to explain this?

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